2.4.1 CWID-Based Waste Delivery Schedules

Tables 2-1 and 2-2 show the years when each waste stream is scheduled to be delivered to the SSSTF/ICDF, the waste release sites, the waste generating WAG, the volume of waste, and the planned treatment/disposal. These tables include both non-aqueous and aqueous waste streams, and are based on the SSSTF Waste Inventory Design Basis, EDF-1540 (see Reference 3). Delivery dates were determined by the waste generating sites, and documented in the CWID. Figures 2-8 and 2-9 show the schedules on bar graphs.

Table 2-1. CWID-Based Nonaqueous Waste Schedule.

Year	Release Site	WAG	Volume (yd^3)	Anticipated Treatment
2001	TSF-06, Area B	1	8,181	Landfill
	CFA-04	4	800	Stabilization
	TSF-07	1	1	Stabilization
2003	Borax-08	10	131	Landfill
	TSF-26	3	10,216	Landfill
	TSF-09,18	1	4,365	Landfill
	Borax-01	10	11,110	Stabilization
2004	ARA 23	5	23,250	Landfill
	ARA-1	5	1,191	Landfill
	CPP-37 A&B	3	56,740	Landfill
	CPP-97	3	1,500	Landfill
	TSF-3	1	1,074	Landfill
	CPP-34a,b	3	27,352	Landfill
	ARA-12	5	983	Stabilization
	WRRTF-1	1	20,070	Stabilization
	CPP-92	3	1,370	Stabilization
	CPP-98	3	250	Stabilization
	CPP-99	3	126	Stabilization
2005	ARA-23	5	23,250	Landfill
	ARA-1	5	1,191	Landfill
	CPP-37 A&B	3	56,740	Landfill
	CPP-19	3	3,780	Landfill
	CPP-67	1	49,630	Landfill
	CPP-14	3	11,046	Landfill
	CPP-48	3	296	Landfill
	ARA-12	5	983	Stabilization
2006	CPP-3	5	10,940	Landfill
2006	CPP-55	3	370	Landfill
2006	CPP-44	3	89	Landfill
2006	CPP-67	3	49,630	Landfill
2006	D&D	3	2,454	Landfill

Table 2-1. (continued).

2007	CPP-1,4,5	4	4,260	Landfill
2007	CPP-11	3	1,491	Landfill
2007	CPP-8,9	3	3,100	Landfill
2007	CPP-10	3	422	Landfill
2007	D&D		392	Landfill
2008	CPP-13	3	4,022	Landfill
2008	CPP-36,91	3	12,520	Landfill
2008	CPP-35	3	311	Landfill
2008	CPP-93	3	2,667	Landfill
2008	D&D		791	Landfill
2009	D&D		1,744	Landfill
2010	D&D		1,271	Landfill
[redacted]	CPP-69	3	61	Landfill
	D&D		63,933	Landfill
	CFA-04	4	7,555	Landfill
	IDW		79	Landfill
	D&D		72	Stabilization
	TOTAL		**483,800**	

Table 2-2. Aqueous Waste Schedule.

Date	Group	WAG	Volume (gal)
2000	5	3	42,300
2001	5	3	2,100
	OU 3-14	3	21,000
	4	3	5,780
	OU 3-14	3	3,000
	4	3	1,500
	5	3	21,000
	5	3	35,000
	4	3	250
	5	3	7,900
2002	5	3	4,320
	OU 3-14	3	3,000
	5	3	21,000
2003	4	3	7,800
2003	OU 3-14	3	3,000
	5	3	21,000
	4	3	2,900
2004	OU 3-14	3	3,000

Table 2-2. (continued).

Date	Group	WAG	Volume (gal)
	5	3	21,000
	4	3	2,900
2005	OU 3-14	3	3,000
	5	3	21,000
	4	3	2,900
2006	4	3	2,900
2007	4	3	2,900
	TOTAL		**262,450**

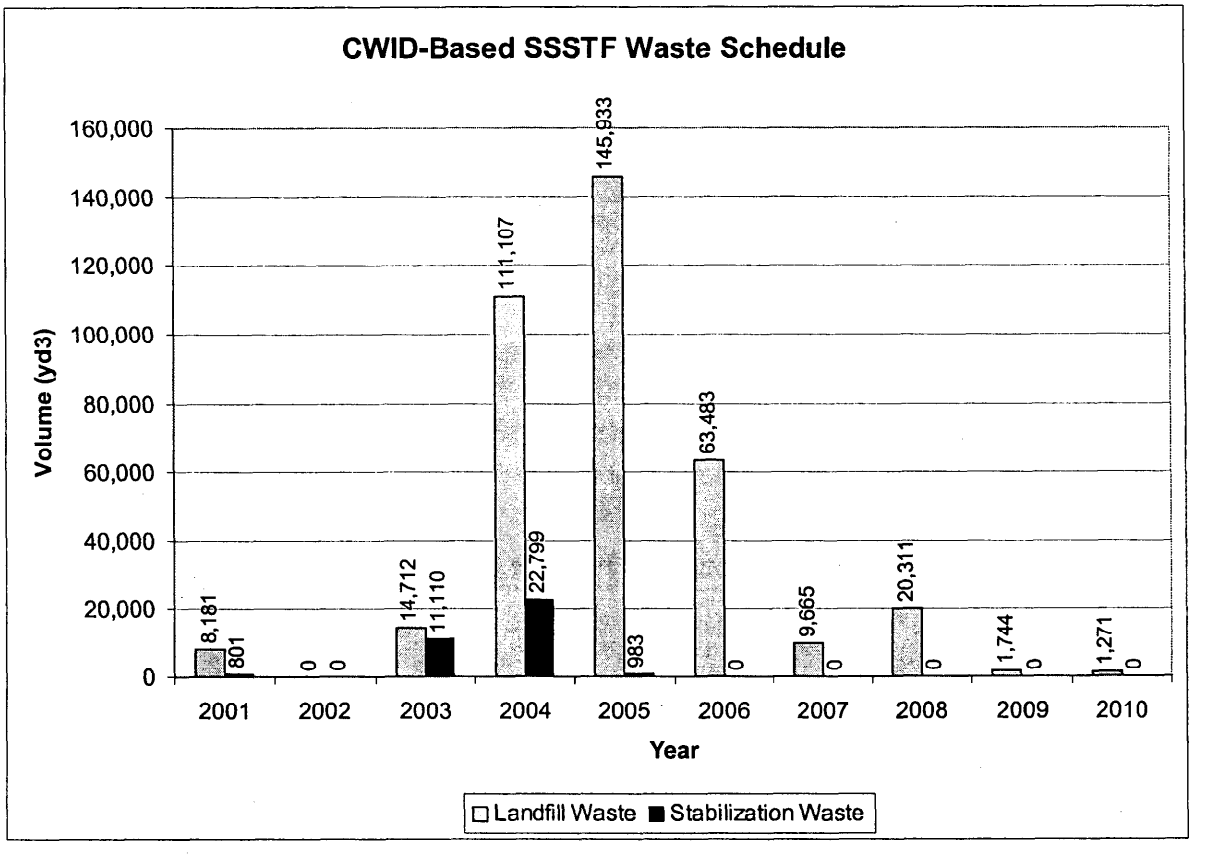

Figure 2-8. CWID-Based nonaqueous waste schedule.

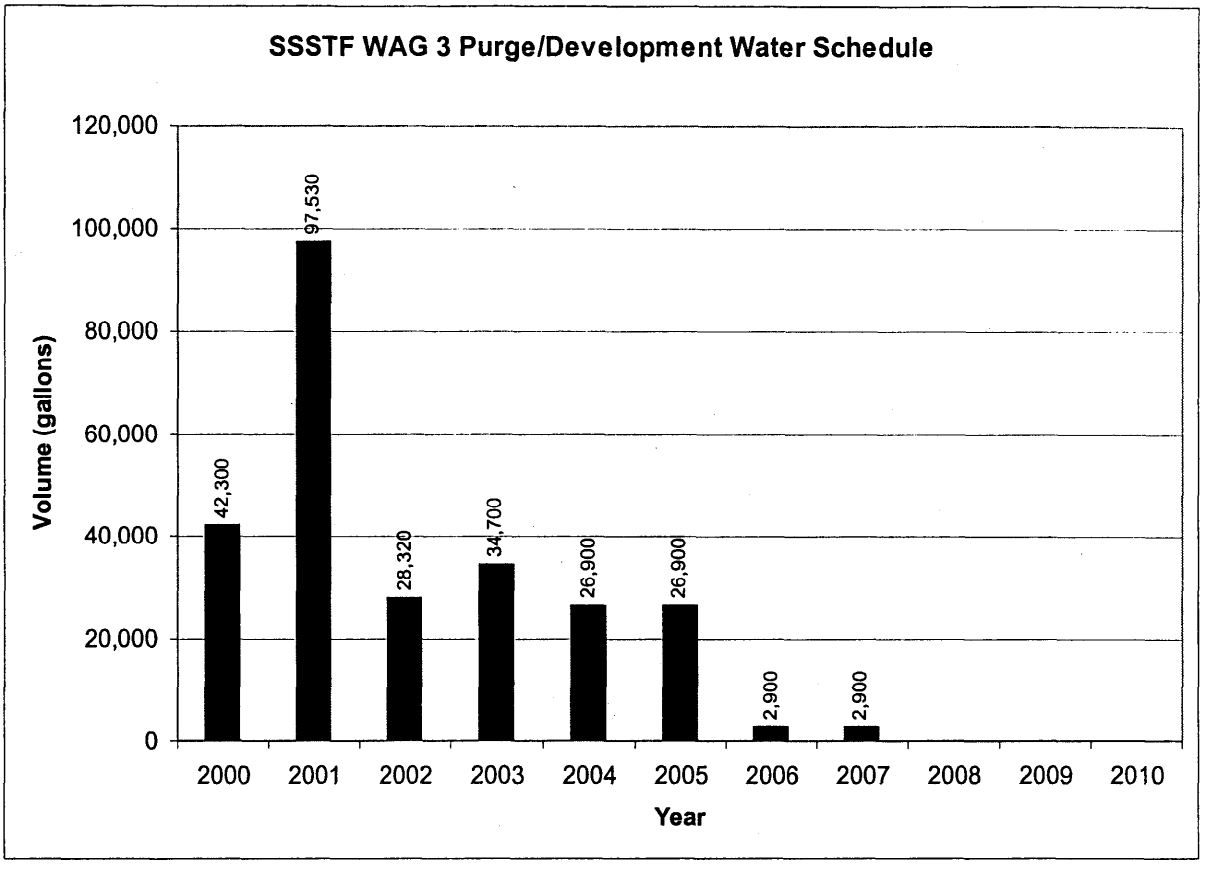

Figure 2-9. SSA aqueous waste water schedule graph.

2.4.2 CWID-Based Incoming Waste Rate Summary

The total and yearly waste rates are summarized below in Table 2-3.

Figure 2-8 shows that the majority of the waste volume in each year is landfill waste. The figure also shows that the total amount of non-aqueous waste (both landfill and stabilization waste) is greatest in the year 2005 (146,916 yd^3).

The aqueous waste from well purging and development is stored in the SSA until the SSSTF opens in 2003. Since non-aqueous waste inputs are low in 2003, it is assumed that the well purge/development water will be processed through the SSSTF in 2003.

Table 2-3. CWID-Based Waste Volume Summary.

Waste Type	Total Volume	Max Yearly Volume	Peak Year
Landfill Waste	448,035 yd^3	145,933 yd^3	2005
Stabilization Waste	35,765 yd^3	22,799 yd^3	2004
Well Purge/Development Water	262,450 gal	168,150	2003 (total from 2000-2003)

2.4.3 Waste Processing Schedule Options

As shown in Figure 2-8, the schedule for incoming waste is highly variable. Four design approaches for managing this variability were considered. The first approach was to process waste at the average incoming waste rate based on the years the facility is expected to be operating (2003-2008), and to store the incoming waste above this average. The second approach was to process the waste at 40% above the average. The third approach considered was to process the waste at the peak input rates. The fourth option considered was to negotiate with the waste generating WAGs to store or delay generation of wastes until later years to level out the incoming waste rates. This option was selected.For this option, a modified non-aqueous waste schedule has been prepared and is presented in Section 2.4.4. Trade-offs for these approaches are costs of storage, costs of equipment and operating costs. Summaries of the processing and storage requirements of the 4 approaches, or options, are shown in Table 2-4.

Table 2-4. Approximate Processing Rates and Associated Storage Requirements for Processing Calculation Options.

Waste Type	Landfill Waste Rate	Stabilization Waste Rate	Storage Required
Option 1 – Processing Rate = Avg Incoming Waste Rate	70,000 yd^3/yr 458 yd^3/day	5,700 yd^3/yr 37 yd^3/day	142,000 yd^3 10,900 containers (13 yd^3 ea)
Option 2 – Processing Rate = 140% of Avg Incoming Waste Rate	100,000 yd^3/yr 654 yd^3/day	8,000 yd^3/yr 52 yd^3/day	77,000 yd^3 5,930 containers (13 yd^3 ea)
Option 3 – Processing Rate = Max Incoming Waste Rate	146,192 yd^3/yr 956 yd^3/day	21,106 yd^3/yr 138 yd^3/day	0 yd^3 0 containers
Option 4 – Processing Rate = Max Incoming Waste Rate from Modified Receipt Schedule (see Sec 2.4.4)	75,577 yd^3/yr 494 yd^3/day	11,110 yd^3/yr 73 yd^3/day	0 yd^3 0 containers

2.4.4 Modified Waste Receipt Schedule

The modified waste receipt schedule involves moving some of the waste streams currently scheduled to be received in the peak input years to years when the planned receipt rates are lower. Also included are the waste streams produced prior to 2003 when the SSSTF is scheduled to open. These changes will require negotiations with the affected waste producing WAGs and storage of the waste produced prior to 2003 in the SSA. The proposed changes are summarized in Table 2-5 and the modified schedule is given in Table 2-6 and Figure 2-10.

Table 2-5. Proposed Waste Receipt Schedule Change Summary.

Release Site	WAG	Volume (yd^3)	Currently Scheduled Date	Modified Date
Landfill Waste				
TSF-06, Area B	1	8,181	2001	2003
CPP-37 A&B	3	56,740	2004	2007
CPP-37 A&B	3	56,740	2005	2008
CPP-19	3	3,780	2005	2007
CPP-48	3	296	2005	2007
CPP-14	3	11,046	2005	2008
Stabilized Waste				
TSF-07	1	1	2001	2004
CFA-04	4	800	2001	2004
WRRTF-1	1	10,035	2004	2005
WRRTF-1	1	10,035	2004	2006

Table 2-6. Modified Nonaqueous Waste Schedule.

Date	Release Site	WAG	Volume	Treatment
2003	Borax-08	10	131	Landfill
	TSF-26	3	10,216	Landfill
	TSF-06, Area B	1	8,181	Landfill
	TSF-09,18	1	4,365	Landfill
	Borax-01	10	11,110	Stabilization
2004	ARA 23	5	23,250	Landfill
2004	ARA-1	5	1,191	Landfill
	CPP-97	3	1,500	Landfill
	TSF-3	1	1,074	Landfill
	CPP-34a,b	3	27,352	Landfill
	CFA-04	4	800	Stabilization
	ARA-12	5	983	Stabilization
	TSF-07	1	1	Stabilization
	CPP-92	3	1,370	Stabilization
	CPP-98	3	250	Stabilization
	CPP-99	3	126	Stabilization
2005	ARA-23	5	23,250	Landfill
	ARA-1	5	1,191	Landfill
	CPP-67	1	49,630	Landfill
	ARA-12	5	983	Stabilization
	WRRTF-1	1	10,035	Stabilization

Table 2-6. (continued).

Date	Release Site	WAG	Volume	Treatment
2006	CPP-3	5	10,940	Landfill
	CPP-55	3	370	Landfill
	CPP-44	3	89	Landfill
	CPP-67	3	49,630	Landfill
	D&D	3	2,454	Landfill
	WRRTF-1	1	10,035	Stabilization
2007	CPP-37 A&B	3	56,740	Landfill
	CPP-1,4,5	4	4,260	Landfill
	CPP-19	3	3,780	Landfill
	CPP-11	3	1,491	Landfill
	CPP-8,9	3	3,100	Landfill
	CPP-10	3	422	Landfill
	CPP-48	3	296	Landfill
	D&D		392	Landfill
2008	CPP-37 A&B	3	56,740	Landfill
	CPP-13	3	4,022	Landfill
	CPP-14	3	11,046	Landfill
	CPP-35	3	311	Landfill
	CPP-93	3	2,667	Landfill
	D&D		791	Landfill
2009	CPP-36,91	3	12,520	Landfill
	D&D		1,744	Landfill
2010	D&D		1,271	Landfill
Date Unknown	CPP-69	3	61	Landfill
Date Unknown	D&D		63,933	Landfill
Date Unknown	CFA-04	4	7,555	Landfill
Date Unknown	IDW		79	Landfill
Date Unknown	D&D		72	Stabilization

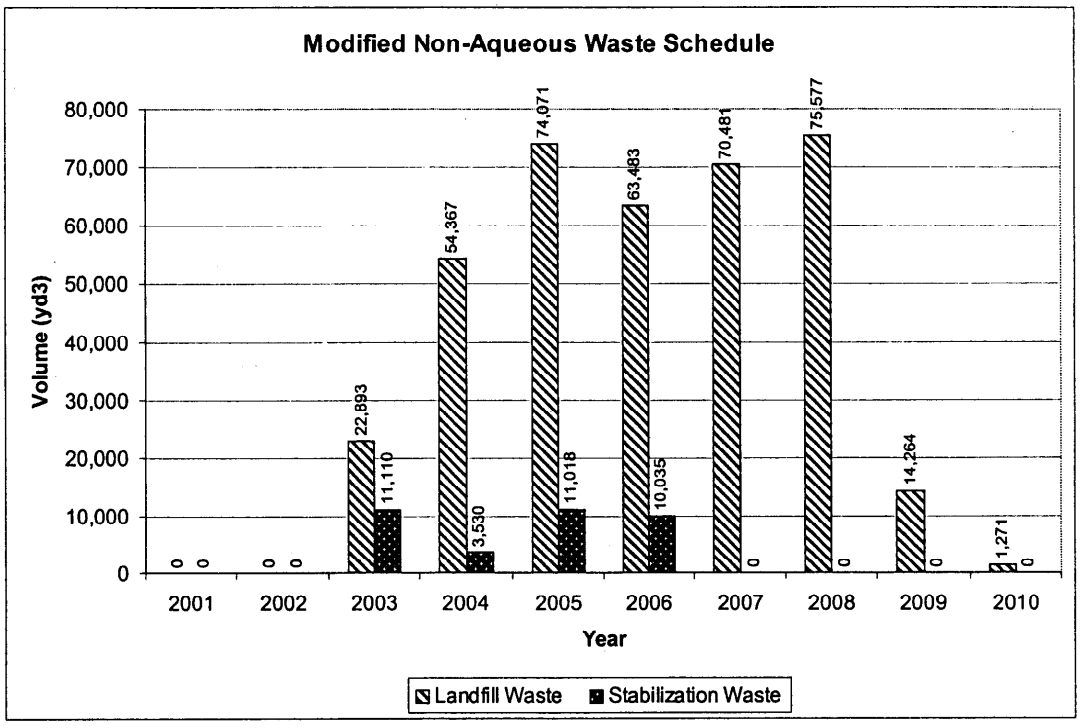

Figure 2-10. Modified nonaqueous waste schedule.

2.4.5 Modified Incoming Waste Rate Summary

The total and yearly waste rates based on the modified schedule are summarized below in Table 2-7.

Table 2-7. Waste Volume Summary using Modified Waste Schedule.

Waste Type	Total Volume	Max Yearly Volume	Peak Year
Landfill Waste	448,035 yd^3	75,577 yd^3	2008
Stabilization Waste	35,765 yd^3	11,110 yd^3	2003
Well Purge/Development Water	262,450 gal	^{202},850 gal	2003 (total from 2000-2003)

2.4.6 Design Processing Rates

Actual design processing rates are based on the modified schedule of incoming waste rates adjusted for load sizes, productivity factors, and operating seasons. The following assumptions were used in the design processing rate calculations:

- 13 yd^3 of waste loaded into 20 yd^3 roll-off containers are the basis for the calculations
- SSSTF will operate 9 months/year = 39 weeks/yr
- SSSTF will operate 4 days/week
- SSSTF will close 3 days for holidays during the 9-month season

- SSSTF will operate on 10-hour shifts with 6 productive hours/shift, including equipment operating downtimes
- Variances from the waste input schedules will be minimal
- Waste delivered to the SSSTF will be level loaded throughout the days and months the facility is open, i.e., waste received each month will be 1/9 of the total yearly waste, and each day will be 1/16 of the monthly total.

The number of operational days per year is calculated as

Op days/yr = (39 wk/yr)*(4 days/wk) - 3 holidays/operating year = 153 operating days/year.

2.4.6.1 Landfill Waste Design Processing Rates. The processing rate of waste that can be sent to the ICDF landfill without treatment is based on a maximum input of 75,577 yd^3 per year in 2008 and is calculated below.

V_{lf} = (75,577 yd^3/yr) / (153 days/yr)

= 494 yd^3/day

= 38 containers/day [13 yd^3 roll-off containers]

The time allowed per load is calculated as

t_{lf} = (1 day/38 loads)(6 hr/shift)(60 min/hr)

= 9.5 min/load

2.4.6.2 Stabilization Waste Design Processing Rates. The processing rate and time per load of waste requiring stabilization are based on a maximum input of 11,110 yd^3 in year 2003 and are calculated below.

V_{stab} = (11,110 yd^3/yr) / (153 days/yr)

= 72.6 yd^3/day

= 6 loads/day

t_{stab} = (1 shift/6 loads)(6 hr/day)(60 min/hr)

= 60 min/load

2.4.6.3 SSSTF Waste Receiving Design Rates. The processing rates for transport vehicles are based on 13 yd^3 roll-off containers. The maximum combined volume of non-aqueous waste to be received in a single year at the SSSTF is in the year 2005. It is assumed that during this peak input year, well purge/development water will not be processed through the SSSTF to the ICDF evaporation pond. The receiving rate, then, is the total of the landfill and stabilization waste rates:

V_{rec} = (11,110 yd^3/yr + 75,577 yd^3/yr) / (153 days/yr)

= 567 yd^3/day

= 44 containers/day

t_{rec} = (1 shift/44 loads)(6 hr/day)(60 min/hr)

= 8.3 min/load

2.4.6.4 SSSTF Storage Requirements. To provide for possible stabilization rate variations and for post-treatment sampling turn-around times, staging areas for four days of incoming waste and six days of outgoing waste are provided near the treatment building. The calculations for the minimum number of containers requiring staging at the treatment area are based on the stabilization waste calculations in Section 2.4.6.2 and are given below. The number of spaces and associated areas used in the facility design are presented in SSSTF Waste Storage and Staging, EDF-1545.[4]

Pre-treatment staging:

minimum # spaces = (6 loads/day)(4 days)

= 24 spaces

Post-treatment staging:

minimum # spaces = (6 loads/day)(6 days)

= 36 spaces

2.4.7 Manpower Requirements

This section estimates the staffing requirements of the SSSTF/ICDF based on the schedule requirements from the previous calculations. These manpower estimates reflect the program's expectation of minimal operating costs. Operating personnel are kept to a minimum. The assignment of an SSSTF operations manager and the preparation of a detailed computer process model during the 90% design phase will help provide more accurate manpower requirements for actual SSSTF/ICDF operations.

2.4.7.1 Hours/Shifts. Except when responding to emergencies, the SSSTF will routinely process waste in yearly campaigns that begin in March and end in November. However, the facility will be operational the remainder of the year. Packaging for off-site disposal and minimal waste acceptance for storage will be required year round. Waste monitoring and management operations will be required year round. The SSSTF will operate 10 hours per day and 4 days per week.

2.4.7.2 Personnel Numbers and Skills

Tables 2-8 through 2-11 contain an initial assessment of the personnel necessary to operate the ICDF. These estimates are based on the SSSTF process flow diagrams, calculations on process rates in peak years, and the assumptions listed below.

- On-site radiation level surveys before entering the SSSTF will not be required for any loads delivered in peak years.
- Receiving and exiting will each require only 1 administrative person, with no radiation control technicians or operators.
- The 2 truck drivers delivering waste to the SSSTF and returning empty containers are the responsibility of the waste generating WAGs, not the SSSTF.
- The 2 truck drivers delivering roll-off containers from the staging area to the stabilization building and also delivering refilled roll-off containers of stabilized waste to the landfill are the responsibility of the SSSTF.
- Unloading at landfill takes 1 laborer and 2 radiation control technicians.
- Unloading at landfill is estimated to take ≤ 8 min/truck.

- Containers require only rinsing, not full decontamination.
- All trucks require external survey leaving the landfill.
- 5% of trucks will require decontamination after leaving the landfill.
- A truck survey will require 5 min per truck with 1 radiation control technician per survey.
- Decontamination will require 1 operator.
- No decontamination of the truck leaving stabilization will be needed.

Table 2-8. Manpower Requirements for Waste Receiving Function.

Receiving			
	Manloading Times		Process Time/Load in Minutes
Task	Radcon Man Minutes	Administrative Man Minutes	
Radcon Survey/decon	N/A	N/A	N/A
Visual Inspection	N/A	2	2
Data Entry	N/A	2	2
Weighing	N/A	4	4
Sampling	N/A	N/A	
Loading	N/A	N/A	
Total Minutes per load		8	8
Total Personnel/Day		1	

Assume: All transports are clean as they enter, no radcon required. Visual inspection and data entry will be performed at the same time by the administrative person listed in Table 2-11.

Assume: All transports are clean as they enter, no radcon required. Paperwork/visual inspection performed at the same time, and data entry/weighing performed at same time.

Table 2-9. Manpower Requirements for Stabilization Treatment Function.

Stabilization Treatment Process								
	Manloading Times in Man-Minutes						Process Time	
	Radcon		Trucker		Operations		Time/Batch	
Task	per truck	per batch	per truck	per batch	per truck	per batch	per truck	per batch
Transfer trucks (2 ea)	5	10	5	10	5	10	5	10
Waste unloading	5	10	5	10	5	10	5	10
Survey outgoing trucks	5	10	5	10	5	10	5	10
Move trucks (2 ea)	~0	~0	~0	~0	N/A	N/A	~0	~0
Transfer reagents and mix	N/A	N/A	N/A	N/A	30	50	30	50
Load trucks (2)	N/A	N/A	10	30	15	30	15	30
Cover trucks (2)	10	20	N/A	N/A	10	20	10	20
Transport trucks (2) to ICDF	N/A	N/A	10	20	N/A	N/A	10	20
Sampling (Assume included in operational tasks above)								
Total Minutes per batch truck loads	25	50	35	70	70	130	80	150
							See Note 1	
Total Personnel/Day	**1**		**2**		**2**			

Note 1: Since unloading a new batch will begin as soon as the previous batch is loaded into the transport container, the process time for a single day (6 containers, or 3 batches) is [3*(10+10+10+0+50+30 min)] + (20+20 min) = 6 hr, 10 min, just slightly more than the 6 productive hours expected per day.

Table 2-10. Manpower Requirements for Landfill Support Function.

ICDF Landfill Support				
	Manloading Times/Load			Process Time/Load
Task	Radcon Man Minutes	Trucker Man Minutes	Operations Man Minutes	Process Minutes
ICDF Landfill waste unloading				
Activities associated with Transport to landfill	N/A	5	N/A	5
Unload	2.5	2.5	2.5	2.5
Spray back end of waste container	2.5	N/A	2.5	2.5
Paperwork	2.5	N/A	2.5	2.5
Operate heavy equipment in landfill	N/A	N/A	8	8
Transports exiting the ICDF Landfill				
Survey truck	5	N/A	N/A	5 (See Note 1)

Table 2-10. (continued).

ICDF Landfill Support				
	Manloading Times/Load			Process Time/Load
Task	Radcon Man Minutes	Trucker Man Minutes	Operations Man Minutes	Process Minutes
Decontamination and resurvey of truck (See Note 2)	1.5	N/A	N/A	30 (See Note 2)
Total Minutes/Load	14	7.5	15.5	8 (See Note 3)
Total Personnel for Unloading	**1**	**1**	**2**	
Total Personnel for Surveying	**1**	**-**	(See Note 2)	
Total Personnel per day	**2**	**1**	**2**	

Note 1: Peak operations of 44 trucks received per day. Assume that 1 radcon personnel required per survey. 100% of transports need survey, 5% of the transports need decontamination. Allow 5 minutes per survey per truck.

Note 2: Decontamination and resurvey of 5% of the trucks requires one person approximately 30 minutes per truck. Total time for this activity is (44trucks/day)(0.05)(30min/truck)=66 minutes/day. This activity is assumed to be covered by personnel from the stabilization facility in their spare time.

Note 3: Since a truck will be transported at the same time the last truck is unloaded, the container is sprayed and paperwork filled out, and heavy equipment operated, total process time is the total of the maximum time for sequential activities, i.e., 8 minutes for heavy equipment operation.

Table 2-11. Manpower Requirements for SSSTF Administrative Support Function.

Support Personnel	
Task	Personnel
Facility Manager	1
Administrative Person (Covered in Table 2-8)	(1)
Radiological Control & Safety Supervisor	1
Chemical Treatment Engineer	1
Total Personnel	3

2.4.7.3 Administrative Support Personnel Descriptions. The responsibilities of the administrative support personnel identified in Table 2-11 are described below:

Facility Manager: Responsible for overall ICDF Complex technical, operational, and administrative management.

Administrative/Secretarial Support: Responsible for waste transport receiving and exiting, IWTS data entry and records control, and clerical support for the facility manager and staff.

Chemical/Treatability Engineer: Responsible for performing daily TCLP analysis and related reporting, performing treatability studies for special case wastes and general technical support related to daily operations.

Radiological Control/ Safety Supervisor: Responsible for supervising the activities of all facility radiological control technicians, providing contingency radiological control manpower support as required, overseeing plant safety, and general reporting and surveillance support for the facility operations.

2.4.7.4 Manpower Estimate Summary. The manpower requirements for the different areas of the SSSTF are estimated to be

- 1 person - receiving
- 5 people - stabilization
- 5 people - landfill/evaporation pond
- 3 people - administrative support
- 1 person – floating operator or radiological control

Total = 15 people